

INTRODUCTION

Ruby Lake National Wildlife Refuge (NWR) is located at the south end of Ruby Valley in northeastern Nevada. The refuge is 65 miles southeast of the town of Elko and lies along the eastern flank of the rugged and scenic Ruby Mountains at an elevation of 6000 feet above mean sea level. In 1938 Ruby Lake NWR was established by Executive Order number 7923 under the Migratory Bird Conservation Act (45 Stat. 1222) as "a refuge and breeding ground for migratory birds and other wildlife...". Lands incorporated into the refuge were withdrawn federal lands and purchased private lands.

The 37,632 acre refuge is contained within a closed hydrologic basin and consists of a marsh bordered by meadows, grasslands, and brush-covered uplands. The shallow, pristine marsh is a mosaic of open water, bulrush stands, and grass/brush-covered islands. During the Pleistocene Epoch, the refuge was part of a much larger body of water presently known as Lake Franklin. This ancient lake covered over 300,000 acres and was more than 200 feet deep. As climatic conditions changed the lake level declined. Today, only 27,000 acres of wetlands remain in Ruby Valley and consist of Ruby Lake and Franklin Lake marshes.

Ruby Lake NWR is one of the most important waterfowl nesting areas in the Great Basin and the Intermountain West. The refuge consistently provides high quality habitats and is strategically located along migration corridors serving both the Pacific and Central flyways. During spring migration, birds converge on the refuge from the Humboldt River drainage to the west, Owens Valley to the southwest, the Great Salt Lake to the east, the Klamath Basin to the northeast and the Colorado River and Imperial Valleys to the south. Because of the biological diversity and pristine condition of the habitat, the South Sump, which is the largest wetland unit on the refuge, was declared a National Natural Landmark in 1972 by the National Park Service.

The marsh is supplied with water from over 150 springs emanating from the basin floor and from springs located along the base of the southern half of the Ruby Mountains. The volume and water content of the snowpack on the mountains directly influences the amount of water provided by the springs. Radio isotope research showed that it takes 1-1.5 years for water from the snowpack to percolate through the mountains and reach the marsh although the pressure created from melting snow influences the volume of water which annually flows from the springs.

Water from some of these springs is collected in a ditch where it can be distributed to five small marsh units and three larger wetland areas. Water reaching the end of the Collection Ditch flows into the 7,300 acre South Sump, a natural depression at the south end of the refuge. Water can also be diverted through the small marsh units to the North and East Sumps to maintain shallow wetlands that are especially attractive to a variety of waterfowl and shorebirds. Water is managed to provide optimum nesting and feeding habitat for migratory waterfowl and other marsh dependent birds. Manipulation of water elevations and flows provides up to 17,000 acres of marsh habitat during consecutive years with average or above average precipitation.

Management of wetland and upland habitats attempts to maintain a high quality ecosystem and a high level of productivity in order to meet the needs of wildlife. Upland areas bordering the marsh are managed for upland nesting waterfowl, sandhill cranes, Canada geese, white-faced ibis and long-billed curlews. Prescribed fire, grazing, haying, and irrigation are used to manipulate vegetation in the meadow and grassland habitats.

The marsh provides habitat for three fish species and muskrats. The largest mule deer herd in Nevada occurs in the nearby Ruby Mountains and some of these animals forage and fawn on the refuge. The refuge has become increasingly more important to pronghorn antelope which use the grasslands during spring, summer and fall. Grasslands and sagebrush steppe provide habitat for rabbits, rodents, coyotes and bobcats which are attracted to the refuge because of high prey availability. Riparian areas on the refuge are host to porcupines, weasels, and many song bird species. Both sage grouse and badgers are observed in the sagebrush steppe areas of the refuge and marmots live in the rocky slopes of the Ruby Mountains. Many raptor species nest in the area or utilize the refuge during migration and winter.

A. HIGHLIGHTS

- ** Time-consuming compatibility review of secondary uses completed ()
- ** Collection Ditch cleaned ()
- ** One of three new refuge signs installed ()
- ** Winter 1993-94 precipitation poorest of recent drought years ()
- ** Refuge Operations Specialist trainee transfers ()
- ** Received military surplus Case loader ()
- ** Two 286 computers replaced with two 486 computers ()
- ** Staff responded to record number of wildfires in our initial attack area ()
- ** Canada geese marked with neck collars ()
- ** Highest number of trumpeter swans produced since 1981 ()

B. CLIMATIC CONDITIONS

After a record 1992-93 winter, precipitation and snowpack during the 1993-94 winter was well below average, again! Water year precipitation (October 1993 through September 1994) totaled 9.63 inches which was 2.97 inches below the long term water year average and 6.28 inches below the 1993 water year. Total calendar year precipitation for 1994 was 1.67 inches below the total for 1993 and 0.66 inches below the long-term average (Table 1). Nearly 45 percent of the calendar year precipitation was received during the last three months of 1994. Average monthly maximum and minimum temperatures were above average (especially during late July and early August), except during the last three months of the year when temperatures were below average. A record amount of snow was received and a record minimum temperature of -10°F occurred in November. Evaporation during 1994 was well above the long term average and 6.86 inches more than 1993 due to a longer duration of high summer temperatures.

Table 1. Climatic Conditions at Ruby Lake NWR during 1994

Month	Precipitation		Evaporation ^a		Snow		Average Temperature (°F)			
	(inches)		(inches)		(inches)					
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
1994	Ave ^b	1994	Ave	1994	Ave ^c	1994	Ave ^d	1994	Ave ^d	1994
Jan	1.05	1.28	-----	-----	9.0	11.2	44	39	17	14
Feb	1.33	1.18	-----	-----	17.0	8.0	40	43	15	18
Mar	0.68	1.39	-----	-----	2.5	7.2	54	48	26	24
Apr	1.19	1.10	4.9	4.4	2.7	3.3	58	58	32	30
May	1.13	1.21	7.2	6.4	0.0	3.5	69	67	40	38
Jun	0.00	0.95	12.0	8.8	0.0	2.5	83	77	48	45
Jul	0.06	0.51	11.9	10.3	0.0	0.0	89	87	54	51
Aug	1.12	0.63	10.3	9.3	0.0	0.0	87	85	51	49
Sep	0.24	0.74	7.0	6.0	0.0	2.4	76	77	41	41
Oct	1.39	0.98	3.3	3.2	1.5	1.6	59	65	30	31
Nov	2.89	1.33	-----	-----	37.7	4.1	36	50	13	23
Dec	0.92	1.33	-----	-----	7.7	8.4	39	41	16	15
Total	12.00	12.66	56.5	45.2	78.2	44.8	-----	-----	-----	-----

^a Evaporation not measured November through March^b Average precipitation, 1940 - 1993^c Average annual snow, 1940 - 1993^d Average temperature, 1940 - 1993

Figure 1. Snow and rain received at Ruby Lake NWR, 1940-1994.

D. PLANNING

3. Public Participation

One meeting and a few phone conversations were held with the haying and grazing permittee during preparation of the environmental assessment for haying and grazing on the refuge.

4. Compliance with Environmental and Cultural Resource Mandates

Environmental assessments (EA) and findings of no significant impacts (FONSI) were prepared for secondary uses of the refuge, including haying/grazing and commercial photography during the compatibility review process. Both EA's and FONSI's were signed by the Regional Director.

5. Research and Investigations

Nongame bird surveys of refuge and adjacent habitats were initiated in 1992. The purpose of these surveys is to collect baseline data on nongame bird species occurring in south Ruby Valley during the migration and nesting periods. Transects are surveyed in marsh, meadow, grassland, shrub steppe and pinion-juniper habitats.

A management study proposal (14570-93-01) to determine the effects of coyote population reduction on sandhill crane production at Ruby Lake NWR was submitted to the Regional Office (ARW) in September 1993 and returned in 1994, not approved. No explanation was given for disapproval of the study.

Fall and winter locations of Canada geese nesting at Ruby Lake NWR. A research proposal was prepared in 1993 to determine the fall and winter locations of marked Canada geese. Study objectives include: 1) determine off-refuge locations of Canada geese from August through March, and 2) determine the survival rate both on- and off-refuge. A total of 54 geese were captured and marked with plastic neck collars (black with white codes) and standard aluminum leg bands in 1994. Marked geese have been observed on the Snake River in Idaho. This study is conducted by the refuge wildlife biologist with refuge funding.

Breeding biology and productivity of largemouth bass at Ruby Lake NWR (14570-03). Ongoing research by Michael Green, Fisheries Biologist with the Nevada Division of Wildlife, studying bass nesting and production and angler harvest and influence. Due to low water levels in the South Sump, electro-shocking transects were abandoned in 1991. Creel surveys were not conducted due to the lack of anglers. Electro-shocking was conducted in the Collection Ditch revealing a few trophy class trout but low total fish numbers.

6. **Other**

Refuge Manager Pennington helped to prepare the Interior Basins Ecoregion Plan.

E. **ADMINISTRATION**

1. **Personnel**

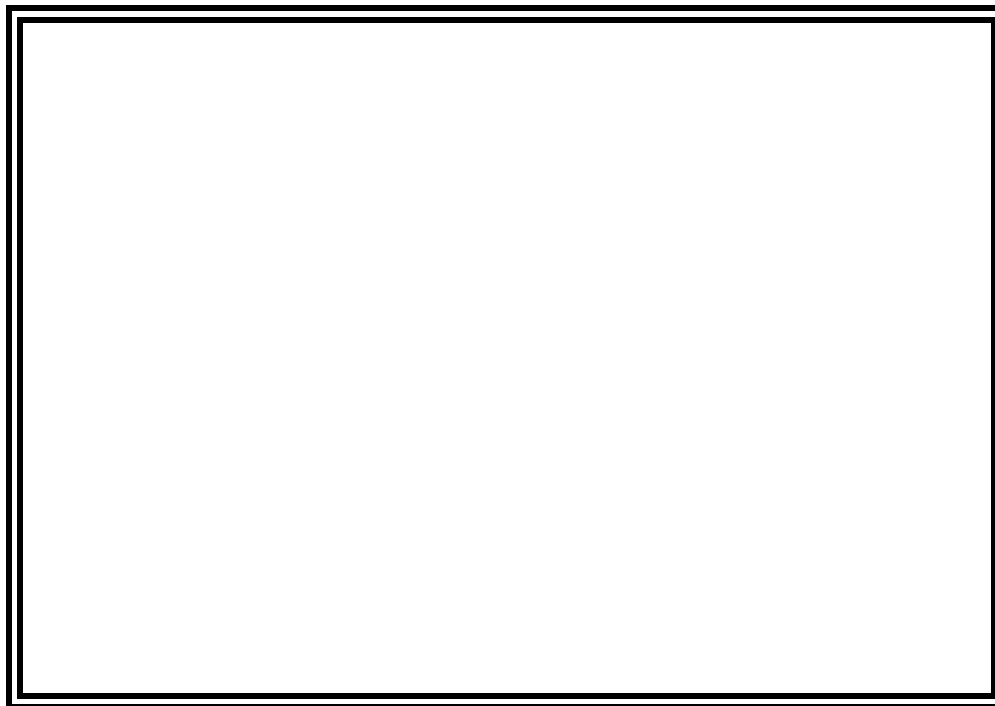


Figure . Left to Right:

- | | |
|---|--|
| 1. Daniel L. Pennington, Refuge Manager | GS 12/1 EOD 08/30/87 |
| 2. Deborah A. Poelker,
Refuge Operations Specialist Trainee | GS 09/3 EOD 06/29/92
Transferred 11/21/94 |
| 3. Jeff Mackay, Wildlife Biologist | GS 09/4 EOD 03/24/91 |
| 4. Monica (Niki) S. McQueary,
Administrative Support Assistant | GS 06/5 EOD 04/24/88 |
| 5. Daniel K. Johnson, Maintenance Worker | WG 09/5 EOD 07/14/91 |
| 6. J. B. Bright, Biological Technician
Temporary | GS 05/1 EOD 04/18/94
Terminated 10/28/94 |
| 7. Mike Pavey, Maintenance Helper
Temporary | WG 07/1 EOD 04/21/93
Terminated 09/30/94 |

Refuge Operations Specialist Trainee Poelker completed her required two-year tour of duty at the refuge in June and transferred to Missisquoi NWR in northern Vermont in November. The position remained vacant for the remainder of the year.

The permanent staffing level has remained unchanged during the past five years (Table). However, in April 1994, Wildlife Biologist Mackay was advised that his position was not identified as a core position and was to be eliminated on October 1 because of the anticipated "funding crisis" in Region 1 during FY95. The justification given for eliminating the Wildlife Biologist position rather than the Refuge Operation Specialist Trainee position was that "administrative personnel are more capable than biologists of conducting both administrative and biological duties". The funding crisis did not materialize and the Wildlife Biologist position has been reinstated as a core position, for now...

Table . Staff levels at Ruby Lake NWR, 1990-94.

Fiscal Year	Perm. Full Time	Perm. Part Time	Temporary	Total FTE
1994	5	0	2	
1993	5	0	1	
1992	5	0	2	

1991	5	0	1
1990	5	0	1

2. Youth Programs

A Youth Conservation Corps (YCC) program was hosted at Ruby Lake NWR from June 13 to August 5. Due to housing constraints, four male enrollees were selected. Jack French, a school teacher in Wells, Nevada, performed an excellent job as YCC Crew Leader, which allowed for many accomplishments by the crew. Refuge Operations Specialist Trainee Poelker provided tail gate safety sessions and environmental education, and overall coordination. Wildlife Biologist Mackay conducted refuge-based environmental education.

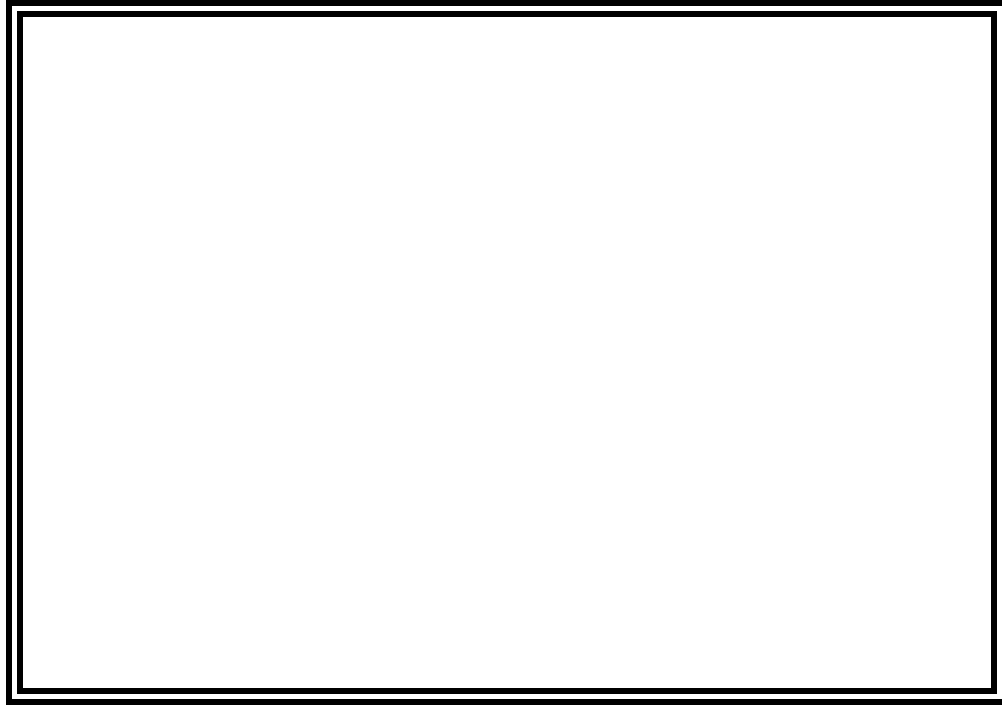


Figure . (Photo of Jack French and YCC enrollees)

During the 1994 camp the following projects were accomplished:

1. Removed exclosure fence in Unit II-G.
2. Removed and rebuilt Narciss Spring exclosure and adjacent fence in Unit I-O.

3. Repaired damaged boundary fence in Unit I-J.
4. Removed fence between Units II-E and III-A.
5. Constructed fence between Units I-J and I-L.
6. Constructed unit division fence east of Gravel Pit Pond.
7. Completed Cow Camp pond fence enclosure.
8. Pulled Russian knapweed and Scotch thistle.
9. Cleaned boneyard, maintenance shop and vehicles.
10. Constructed three walk-through gates and one wire gate at east side of Brown Dike, North County Line Pond and North Narciss Pond.
11. Modified 1.8 mile of fence along boundary of Unit II-E for pronghorn passage.
12. Set up camp, dug latrine pits and set up blinds for Goshute Raptor Project in Goshute Mountains.
13. Assisted with goose capture and marking, and duck banding.

3. Other Manpower Programs

Nevada Division of Forestry provided several prison honor camp crews for projects on the refuge in 1994. The prisoners cut willows on the levee spoils bank to facilitate dragline operations during cleaning of the Collection Ditch. The crews also removed and replaced approximately four miles of wire on the refuge's west boundary fence. The original wire was 14 gauge and was replaced with stronger 12 1/2 gauge wire. These crews provided approximately 1,584 hours of work at a savings to the government of over \$15.0K, based on a WG-03 salary. The refuge supplied a dozen pair of leather gloves and a roll of chain for chain saws.

4. Volunteer Programs

Because of inadequate FTE allocation and salary funding, the time contributed by volunteers is a valuable asset to the refuge. In 1994, eight volunteers (including Federal and State employees) contributed ? hours.

Susan Nash, a local resident, collected, identified and prepared plant specimens for the refuge herbarium.

Seven volunteers participated in the 1994 Christmas Bird Count. Along with refuge staff, they braved the cold to count 45 species and 1,146 individual birds. The participants included personnel from the Elko District Bureau of Land Management (3) and residents of Elko, NV (3) and Long Beach, CA (1).

5. Funding

Operations and Maintenance base funding increased in 1994. However, this increase did little more than make up for inflation. The most recent significant increase in O and M base funding occurred in 1990. The additional O and M funds allowed the refuge to complete a few more high priority projects.

Subactivity 1262 was funded at \$139,000, which included MMS Priority Projects (Table).

Table . MMS projects funded at Ruby Lake NWR in 1994.		
Project No.	Description	Funded Amount
91014M	Rehabilitation of Fire Protection System	60.0K
93007M	Replace Mobile Radios	2.0K
--	Vehicle Replacement	14.0K
--	Overhaul Motor Grader	15.0K
Total MMS funding		91.0K

All MMS Priority projects were completed, except for the rehabilitation of the fire protection system. The fire protection system contract was awarded before the end of the fiscal year and the funds were obligated. The project is expected to be completed during 1995.

Since all MMS Priority projects were contracted, none of the money could be used to offset O and M salary costs.

The refuge fire budget was funded at \$13,000; subactivity 9120 receiving \$12,000, and subactivity 9110 \$1,000. This funding allowed the purchase of a 1,000 gallon water tank, lights and sirens for vehicles, a portable pump and maintenance on equipment and the RAWS fire weather station. Funds designated for prescribed fire were \$5,500 and were included in 1261 base funding.

The refuge was provided \$5,000 in subactivity 6860. These funds were used to administer the grazing and haying program.

Table . Station funding levels for the past five years (000's).							
FY	1261	1262	6860	9110	9120	1120	Total
1994	255.0	139.0	5.0	1.0	12.0	0	412.00
1993	191.0	100.6	5.0	0	8.0	1.0	305.60
1992	191.0	78.0	5.0	0	17.0	3.0	294.00
1991	191.5	137.0	5.0	0	2.0	0	335.50
1990	191.0	64.06	5.0	0	78.8	0	338.86

Two recreational fisheries projects were funded in FY-93 under a special 1332 fisheries appropriation. The projects included cleaning the Collection Ditch (\$50.5K) and the purchase and installation of a water control structure on the east end of Brown Dike (\$10.0K). However, these funds were routed through Fisheries and not earmarked for Ruby Lake NWR. Fisheries had expended or obligated the funds before the error was discovered; Refuges and Wildlife in the Regional Office crafted an arrangement with Fisheries to replace the funds in FY-94. The refuge received the funds in FY-94 and the refuge projects were completed (Section I.2).

6. Safety

Fire breaks were disced around the refuge headquarters and residences as well as the Gallagher Fish Hatchery residences.

Furnaces and woodstoves were inspected and maintained in preparation for winter.

Fire extinguishers were inspected and maintained as necessary. The data base to track fire extinguisher maintenance needs was brought up-to-date.

Refuge staff and the YCC crew received certification in basic First Aid and adult CPR.

Refuge Operations Specialist Trainee Poelker conducted quarterly safety meetings which covered the following topics: Safe operation of outdoor power equipment, escaping home fires and use of fire extinguishers.

Refuge Operations Specialist Trainee Poelker conducted the Annual Refuge Safety Inspection. Minor safety hazards were identified.

There were no lost time accidents this year involving service personnel or volunteers. However, several minor accidents/incidents were recorded: 1) Biological Technician Bright hit a hidden hole and rolled a four-wheel ATV during goose banding operations; 2) Refuge Operations Specialist Trainee Poelker stalled a four-wheel ATV during ignition of a prescribed fire resulting in the melting of rear and side plastic fenders; 3) Refuge Manager Pennington dented the driver's side door of the Ruby Lake 21 engine when he intentionally drove through a closed wire gate during suppression of the Ruby School Fire; 4) a YCC enrollee punctured his leg with barbed wire during fencing maintenance; 5) a YCC enrollee struck his leg with a hammer while driving survey stakes into the ground; and 6) Temporary Maintenance Worker Pavey was involved in a tort claim; the claim was submitted by a refuge visitor claiming that while Maintenance Worker Pavey was conducting mowing operations along a refuge road, the mower threw a rock into the visitor's windshield. The refuge paid the claim which totaled \$237.89.

8. Other

a. Staff Training

Refuge Manager Pennington

02/28-03/05 Law Enforcement Refresher, Tucson, AZ
 06/21 ADP Training, Portland, OR
 07/21 Basic First Aid and Adult CPR, Refuge Headquarters
 08/11 Firearms Requalification, Fallon, NV

Refuge Operations Specialist Poelker

01/09-14 Intermediate Wildlife Fire Behavior, Boise, ID
 01/31-02/01 Pesticide Use Certification, Elko, NV

Wildlife Biologist Mackay

07/26-29 Fire Planning and Implementation, Austin, TX
 09/22 EEO/Human Resource Training, Tape course, Refuge Headquarters
 10/20,21,24 EEO/Human Resource Training, Tape course, Refuge Headquarters
 11/03, 04 EEO/Human Resource Training, Tape course, Refuge Headquarters

Administrative Support Assistant McQueary

02/13-17 Mid-Career Pre-Retirement Training, Reno, NV
 06/20 Windows 3.1, Portland, OR
 06/21 ADP Training, Portland, OR
 07/21 Basic First Aid and Adult CPR, Refuge Headquarters
 09/22 EEO/Human Resource Training, Tape course, Refuge Headquarters
 10/20,21,24 EEO/Human Resource Training, Tape course, Refuge Headquarters
 11/03, 04 EEO/Human Resource Training, Tape course, Refuge Headquarters
 11/16-17 RBase Refresher Training, In-House, Refuge Headquarters

Maintenance Worker Johnson

02/28-03/05 Law Enforcement Refresher, Tucson, AZ
 02/13-17 Mid-Career Pre-Retirement Training, Reno, NV
 07/21 Basic First Aid and Adult CPR, Refuge Headquarters
 09/27 Firearms Requalification, Fallon, NV
 09/22 EEO/Human Resource Training, Tape course, Refuge Headquarters
 10/20,21,24 EEO/Human Resource Training, Tape course, Refuge Headquarters
 11/03, 04 EEO/Human Resource Training, Tape course, Refuge Headquarters

b. Meetings, Tours and Presentations

03/07-11 Pennington, Poelker, Mackay attended Project Leaders Meeting/Compatibility Training, Beaverton, OR
 03/30 Pennington, Mackay attended Annual Grazing Meeting with Permittee Duval Ranching Company, Ruby Valley, NV
 04/13 Pennington, Poelker, Mackay attended Coordination Meeting with Nevada Division of Wildlife Personnel, Elko, NV
 05/02 Pennington, Poelker, Mackay attended Interagency Fire Meeting, Baker, NV

- 06/22 Pennington attended meeting at the Regional Office and attended Outreach Briefing at Ridgefield NWR, Portland, OR and Ridgefield, WA
- 09/06-08 Pennington attended Interior Basin Ecoregion meeting, Reno, NV
- 11/30 Pennington attended interagency and NGO meeting to discuss preparation of "Nature Notes" articles for publication in local newspaper, Elko, NV
- 12/12-13 Pennington attended Interior Basin Ecoregion meeting, Reno, NV

Multi-agency Visitor Center: Refuge Manager Pennington attended several meetings with representatives from the Humboldt National Forest, US Forest Service, Elko District Bureau of Land Management, Elko and Wells Chambers of Commerce and the Nevada Commission on Tourism to continue planning efforts for the proposed multi-agency visitor center. Pennington continued to serve as chairman of the group.

c. Visiting Dignitaries

Assistant Associate Manager Mike Nunn visited the refuge July 12-13 for the annual review and inspection.

F. HABITAT MANAGEMENT

2. Wetlands

Wetlands on the refuge include permanently and seasonally flooded shallow marsh and infrequently flooded alkali playas. The average depth of the permanent marsh area is 3.5 feet with a range of 0.5-12 feet deep. Total wetland acres varies annually because of variability in annual snow pack in the Ruby Mountains. The maximum wetland acreage occurs in the spring and gradually decreases during summer to a minimum acreage in the fall. The permanent marsh habitat consists of a mosaic of open water and emergent vegetation (hardstem bulrush predominantly). Wetland management units include the North Sump, East Sump, South Sump and five small marsh units, delineated by levees, located on the west side of the refuge. Fewer wetland acres were flooded in spring 1994 than in 1993, however, during fall more acres were flooded in 1994 than in 1993 (Table).

Table . Summary of estimated flooded acres in wetland units during 1994.				
Unit	Spring 1994 Average ¹		Fall 1994 Average ¹	
Small Marsh Units	1,240	1,240	1,240	1,240
North Sump	2,040	6,800	7	2,245
East Sump	11	1,755	11	1,400
South Sump	7,000	7,300	5,250	6,900
Collection Ditch	25	25	25	25

^c Incomplete data, see footnote ^b.

Because of the anticipated water shortage, marsh Units 10, 13, 14, 20 and 21 received highest management priority for water delivery. Under this management action, only water in excess of that needed to maintain the five small units at objective elevations is allowed to flow into the other marsh units on a priority basis. The units were all within 0.1 foot of desired management elevations on 1 January. From February through April the water elevations were increased or decreased to achieve desired management elevations for waterfowl nesting. Water elevations in these units were maintained generally at stable levels through June to prevent disturbance to nesting waterfowl. Water elevations were allowed to decrease through evapotranspiration from July through September to enhance waterfowl foraging habitat. Low spring flows during the summer and high evaporation rates, however, resulted in water elevations occurring below desired management elevations in these small units. During fall, the water elevations generally were returned to near desired management elevations. During winter, water was routed through the units to maintain adequate dissolved oxygen levels to prevent fish mortality.

Less water was provided to marsh Units 10, 13, 21, North Sump, East Sump and South Sump during 1994 than during 1993 (Table), and more water was provided to marsh Units 14 and 20 relative to the previous year (Table). Water diversion to the East Sump was kept to a minimum because of habitat enhancement work planned for 1995. During winter, water was routed from the Collection Ditch to the North Sump through Units 20, 14, 13 and 10, in that order. During non-winter months, water in excess of that needed to maintain the small marsh units at desired management elevations was diverted to the South Sump, as specified in the refuge Water Management Plan.

Table . Summary of 1994 marsh unit water management at Ruby Lake NWR.					
Unit	Maximum Elevation	Minimum Elevation	Total Inflow Acre Ft.	Total Outflow ^a Acre Ft.	Net Inflow Acre Ft.
10	5965.38 (5965.42) ^b	5964.70 (5964.78)	1917.56 (2049.60)	1149.06 (1935.50)	768.50 (114.1)
13	5965.66 (5965.71)	5964.40 (5964.72)	1261.28 (1363.28)	992.26 (1002.63)	269.02 (360.65)
14	5965.81 (5965.84)	5964.70 (5964.78)	880.62 (846.80)	495.02 (308.76)	385.60 (538.04)
20	5965.82 (5965.91)	5964.74 (5964.92)	948.59 (886.92)	355.59 (488.04)	593.00 (398.88)
21	5965.75 (5965.59)	5964.44 (5964.23)	1713.38 (2277.59)	1506.76 (2116.44)	206.62 (161.15)

North Sump	5963.92 (5965.12)	5961.93 (5961.84)	1184.04 (2894.20)	0.00 (28.70)	1184.04 (2865.50)
East Sump	5963.36 (5963.82)	5962.24 (5962.28)	63.30 (218.42)	0.39 (0.00)	62.91 (218.42)
South Sump	5963.59 (5963.20) ^c	5961.06 (5960.20) ^c	7710.55 (9258.31)	No Outflow	7710.55 (9258.31)
^a Does not include evapotranspiration. ^b Total flows during 1993 in parentheses. ^c Elevations as measured at the Main Boat Landing.					

To maintain sufficient dissolved oxygen concentrations for fish in the five small marsh units when they were ice-covered, water was supplied from the Collection Ditch and flows were adjusted to pass from Unit 20, north through the other small marsh units and released into the North Sump. Water was supplied to the South Sump directly from the Collection Ditch and via marsh Unit 21 when this unit was ice-covered. No water was intentionally provided to the East Sump during months when the small marsh units were not ice-covered, although a small amount flowed into the unit because of high water in Unit 20.

Approximately five miles of the Collection Ditch, from the water control structure at the Gallagher fish hatchery to the north end, was deepened by dredging. Two culverts and one stop-log water control structure were lowered two feet. This work was needed to facilitate flows from the north end of the Collection Ditch to the south end. The Ditch was deepened to a water depth of five feet.

During the past (and still present?) drought, small isolated cattail (*Typha angustifolia* and *T. latifolia*) stands have expanded and new stands have pioneered rapidly in bulrush habitat in all marsh units. Many of these stands are located along levee roads. In some areas, however, cattails are now the dominant emergent species, having successfully out-competed bulrush. The expansion of cattails may negatively impact over-water nesting duck species because of the loss of open water and the loss of bulrush which is thought to be a superior nesting substrate. Cattail is believed to be an exotic species at Ruby Lake NWR.

The draw-down of marsh Unit 13 was again delayed because of anticipated habitat enhancement work in the East Sump. This work required that the East Sump remain dry, therefore Unit 13 remained flooded to facilitate routing of water during winter.

The water elevation in Unit 21 was intentionally maintained at a higher elevation in order to discourage California gulls from nesting in the unit. Since waterfowl use this unit more for courtship and roosting activities than for nesting, the higher elevation did not affect waterfowl use of the unit.

The southern one-third of the North Sump was flooded during the spring from water provided from marsh Unit 10 (winter flows). The unit was dry by late July but received use by significant numbers of shorebirds and ducks during the spring and summer. In November, water was diverted to the unit from the small marsh units. Areas at the south end of the North Sump became shallowly flooded during early winter and provided excellent foraging habitat for waterfowl, especially Canada geese, mallards, and pintails. The significant use of this unit by wildlife demonstrates the value of providing water to the North Sump rather than to the East Sump. Even though it has been flooded in past years, the East Sump receives very little use by wildlife mostly because very little open water is available.

The East Sump was intentionally kept dry (except for the barrow pits) during 1994 to facilitate completion of anticipated habitat enhancement work. Because of delays in receiving the required state dam safety permit, the work was not commenced in 1994. As a result of being dewatered during the growing season, native grasses colonized areas of the unit which were subirrigated from water in the barrow pits. This habitat is similar to that of the North Sump which is flooded in winter. Shallow flooding of the East Sump during winter has the potential to provide additional high quality foraging areas for waterfowl.

The maximum water elevation in the South Sump occurred in mid-May, approximately one month earlier than in 1993, due to early snow melt caused by above average temperatures in spring. The maximum water elevation was 4.7 inches higher in 1994 than in 1993; however, the minimum elevation in 1994 was 8.0 inches lower than in 1993. Additionally, the water elevations throughout the year were below management-set objective elevations (Figure). During the canvasback nesting period, the water elevation increased 3.7 inches.

Although the South Sump water elevation made significant recovery in 1994 from the drought, the recovery was not continued because of poor winter snow pack. The low water elevation in the South Sump during late summer and fall limited boat access to canoes, with difficulty. Narciss Boat Landing was dry by 1 September. Extensive production of sago pondweed continued in the South Sump as a result of the natural drawdown during 1992.

Much of the open water in the southwest side of the South Sump has become overgrown by bulrush, resulting in the loss of waterfowl habitat. This area is approximately 2,000-2,500 acres of shallow marsh, and the expansion of bulrush was likely accelerated by the drought. The area was used by waterfowl, especially canvasback, redhead and ruddy ducks, for nesting and brood rearing.

The exclosure fence around Narciss spring was replaced to prevent cattle trespass. A new fence on the east side of Gravel Pit Pond was also constructed to prevent livestock from entering the exclosure during periods of low water. These projects were completed by the YCC crew.

<graph of SS objective level vs. observed level>

Figure . Observed and objective water levels in the South Sump during 1994.

5. Grasslands

Discussion within this section relates to other types of upland habitats found on the refuge, including grasslands.

As the elevation of the land gradually increases farther from the marsh, soil moisture levels decrease. This soil moisture gradient produces a variety of upland habitats. Wet meadows, which border the marsh, are replaced by dry meadows, then grasslands, alkali playads, and finally sagebrush steppe or greasewood shrub habitat. Pinion pine and juniper occur at higher elevations and are mostly confined to adjacent Humboldt National Forest and Bureau of Land Management administered lands.

Because of the influence of high water elevation which flooded meadows and grasslands from 1984 through 1986, plant species composition and vegetation structure in the meadows adjacent to the marsh changed drastically. Baltic rush invaded and displaced a large percentage of the grasses and forbs present prior to the flooding. The meadows became unusable by wildlife due to Baltic rush matting caused by snow accumulation and persistent strong west winds. Management activities have concentrated on rejuvenating the meadows to provide high quality waterfowl nesting habitat and goose and crane foraging habitat. Elimination of the dense vegetation mat and reduction of Baltic rush during the past seven years has been attempted through the implementation of prescribed fire. Oddly enough, the drought may have helped achieve this goal. Grasses and forbs appear to be increasing in the vegetation composition because of a decreased amount of soil moisture which has reduced Baltic rush production.

Plant growth in 1994 began earlier than average because of warm temperatures earlier in the spring. Total plant production in the meadows was average or slightly above average, and in grasslands was above average because of abundant spring and summer precipitation. Vegetation production was highest and the active growth period the longest in the meadows adjacent to the South Sump because of subirrigation. Meadows adjacent to the North Sump experienced below average vegetation production because the area was only seasonally flooded. Plant production in upland Unit II-E, adjacent to the East Sump, was average to below average because the marsh unit was dry. Plant production in the upland units adjacent to the small marsh units was average. In the recent past, vegetation production had been reduced refuge-wide because of the lack of summer precipitation and the low water elevation in the marsh.

Several fencing projects were completed during 1994. The remaining section of the enclosure near the gravel pit in Unit II-G was removed. This unit is not grazed, thus there was not a need for the fence. The fence separating Unit II-E from III-A, located on the east side of the refuge, was removed. These units are no longer grazed and the fence was removed to facilitate pronghorn use of the area. A new fence was constructed along the south edge of the Main Boat Landing road. This fence divides the former Unit I-JL into two units, Units I-J and I-L. The fence was needed to prevent cattle from utilizing the greasewood area in Unit I-J. The boundary fence in Unit II-E was modified to pronghorn construction standards.

7. Grazing

Upland units, consisting of meadows, grasslands and shrub-steppe habitat (sagebrush, greasewood, rabbitbrush) are managed to provide a diversity of habitat (structurally and spatially) for a variety of foraging and nesting wildlife. Habitat management goals are achieved through establishment of idle (non-use) areas, prescribed burning, a three-season grazing program, haying and irrigation. Grazing is managed under a four-year rest/rotation grazing program and was the dominant tool used for vegetation manipulation until 1992. In past years, grazing was implemented on 96 percent of the upland areas. Under the draft revised Upland Habitat Management Plan (1993), grazing is now implemented on 51 percent of the uplands, including meadows, grasslands and sagebrush steppe/greasewood areas.

One Special Use Permit (SUP) for grazing was issued to the Duval Ranching Company, a long-time permittee. Grazing was implemented on 6,710 acres in 1994 at a level of 2,301 AUM's (Table ?). The grazing fee was set at \$4.53 per AUM which is an increase of \$0.26 per AUM from 1993. The revenue from grazing collected for 1994 totaled \$10,421.85 and was \$71.67 higher than the revenue collected in 1993. The grazing rate is recalculated annually by inserting index values for changes in cattle prices and production costs into the fair market value formula. Grazing rates are calculated using $FMV = (Base\ Rate)(FVI = BCPI - PPI)/100$, where FMV = Fair Market Value, FVI = Forage Value Index, BCPI = Base Cattle Price Index and PPI = Producer Price Index. This formula was devised (under a contract) by an agronomist at the University of Nevada, Reno.

Higher water elevations, especially in the South Sump, prevented cattle from trespassing into unauthorized units. This has been a problem during the past drought years because low water elevations exposed ground beyond the ends of fences. Retrieving trespass cattle was usually accomplished by refuge staff as the permittee resides over 50 miles from the refuge and often could not respond earlier than 3-5 days due to other commitments.

During the compatibility review, it was decided that some aspects of the grazing program were not compatible. An EA was prepared for grazing (and haying) since one for these uses of the refuge did not exist. The preferred alternative in the EA proposed changes to make grazing compatible. It was determined that early spring grazing of the hay meadows (units hayed the previous fall) was in conflict with refuge objectives for wildlife forage needs and had the potential to damage plants which were beginning new growth.

The spring grazing period of hayed meadows was changed to protect growing plants, reduce wildlife disturbance and provide higher quality wildlife habitat. Prior to 1993, cattle were placed in the meadows (units hayed the previous fall) about 15 April (early spring) which forced wildlife to compete with cattle for green forage and to utilize lower quality habitat at other locations because of disturbance by cattle. In the early spring, wildlife are attracted to hayed meadows because plants begin growth earlier in hayed meadows than in fallow meadows. Heavily utilization of new plant growth by cattle in the early spring, when plants are vulnerable to damage, has the potential to reduce the quality of wildlife habitat. Spring grazing of the hay meadows will be implemented when there is a need to stimulate

high quality plant growth (generally after 15 May) and sufficient plant growth has occurred to prevent damage to young plants. Short duration, light intensity grazing will stimulate regrowth of plants and create a mosaic of plant growth stages throughout the meadows. The regrowth contains a higher nutrient content and thus is of greater nutritional value to foraging wildlife. This will also reduce disturbance to wildlife using the meadows during the early spring. Surveys conducted during 1992-94 showed an increase in the numbers of Canada geese and in the duration of use of the meadows by adult and young geese when cattle grazing was not implemented until after 15 May.

Table . Summary of the 1994 grazing program at Ruby Lake NWR.					
Unit	Acres	AUM's Prescribed Actual		Season of Use ¹	Utilization ²
I-A	79.0	100	96.57	S	Moderate
I-C	31.4	90	55.55	LS	Moderate
I-D	54.8	100	92.54	LS	Moderate
I-E	55.3	0	310.65	W	Hayed (Heavy)
I-F	145.2	300	142.04	F	Hayed (Heavy)
I-GH	251.8	224	202.42	S	Moderate
I-I	102.5	178	191.75	S	Moderate
I-M	220.0	345	210.46	F	Moderate
II-C	590.0	100	111.92	ES	Moderate
II-F	364.6	305	364.00	W	Hayed (Heavy)
II-H	688.0	200	157.85	ES	Light
III-C	2,758.6	326	290.44	F	Moderate
III-E	324.0	85	74.44	LS	Moderate
Total		2353	2300.63		
¹ Season of Use: Early Spring (ES) = 15 April to 15 May, Late spring (LS) = 15 May to 15 June, Summer (S) = 16 June to 15 August, Fall (F) = 16 August to 16 October, Winter (W) = 15 October until hay consumed (~15 December) ² Utilization: Light = 25-40 % utilization, Moderate = 40-65 % utilization, Heavy = 65-90 % utilization					

8. Haying

Two to three of five meadow units are hayed annually to provide short grass foraging areas for Canada geese and a variety of other wildlife. Haying removes dense overstory plant species to a consistent height which provides foraging habitat for sandhill cranes and Canada geese during spring and early summer. Large numbers of white-faced ibis and egret species are attracted to these meadows while the hay meadows are under irrigation.

Irrigation of the hay meadows was initiated in early April and was terminated at the end of July. Vegetation production in Units I-C and I-E was good to excellent in both units. Poor vegetation production occurred in I-F because there was not enough water available to adequately irrigate the entire unit. Unit I-D was not irrigated during 1994.

During 1994 only two of the five hay meadows were prescribed for haying. However, the permittee hayed a third unit (Unit I-E) which was scheduled for non-use. The permittee claimed he misunderstood which meadows he was allowed to hay, despite numerous attempts by refuge staff to prevent any misunderstanding (this also occurred in 1993). Cattle were allowed to graze the unit to prevent impacts to the habitat from hay piles (which would inhibit plant growth the following year). Because of an insufficient amount of vegetation, Unit I-F was not hayed, but grazed during the fall. A total of 816.69 AUMs were utilized in the three units.

In conjunction with the compatibility review of grazing, haying was also reviewed for compatibility. Activities and issues which did not meet refuge objectives were identified. These included accumulation of residual hay piles which reduced vegetation production in meadows, and hay meadows which were not harvested at the proper time to provide late summer foraging areas for wildlife.

As a result of the compatibility review, modifications to the hay program were proposed in the preferred alternative of the grazing and haying EA. These modifications were implemented in 1994. Hay meadows will be harvested between 1-15 August which is one to two months earlier than in past years. These meadows will provide short stubble foraging areas for wildlife at a time when other meadows contain tall vegetation. Hay harvested during this period is more palatable and nutritious to cattle. Better quality hay will encourage more complete consumption of hay piles, and thus reduce or eliminate the accumulation of hay piles. Locally, cattle ranch operators begin harvesting hay from meadows in mid-July in order to capture high levels of nutrients in the harvested hay. In past years, the permittee was allowed to harvest the hay at his convenience.

9. Fire Management

Prescribed fire is used primarily as a means of rejuvenating upland areas covered by dense, matted baltic rush which restricts and retards vegetation growth (Figure ?). Fire also enhances the establishment and production of forbs and grasses by recycling nutrients. In the past four years, we have attempted to use fire more aggressively to improve habitat quality in the wet meadows. Vegetation in the wet meadows became densely matted because of flooding during 1983-86. Subsequently, use of the meadows by wildlife was reduced.

During 1994, six of the nine planned prescribed fires were conducted (Table ?). The prescribed fire objectives were achieved for all units but the acreage objectives were only achieved for five units; the acreage objective for Unit II-C was not met. The north half of

the unit was burned in late October. Wet weather in November, which resulted in higher fuel moisture, precluded completion of the prescribed fire in the unit during 1994.

We received assistance from fire crews from the Sheldon and Hart Mountain NWRs and the Ely District Bureau of Land Management, on five fires. The BLM crews provided one light and two heavy engines. The support provided by the crews was critical to completing the fires. Because of the small refuge staff level, interagency cooperation is essential for safely conducting larger prescribed fires. However, lack of available fire crews limits the number of prescribed fires refuge staff can safely conduct.

Table . Prescribed fires planned and conducted on Ruby Lake NWR during 1994.			
Unit	Date Burned	Acres	
		Prescribed	Achieved
I-A	---	25	0
I-N/South Sump	---	170	0
III-C/South Sump	---	510	0
V-C	20 April	10	10
I-K	24-25 May	170	150
I-J	25 May	25	20
V-E	26 May	30	30
20 Uplands	12 October	50	50
II-C	26 October	100	40
Total		1090	300

Northeast Nevada was no exception to the high wildfire activity that occurred in the western United States. Refuge staff responded to a record number 11 reports of lightning-ignited wildfires in our initial attack response area (off-refuge). The first wildfire occurred on 11 June, four occurred in both July and August, and two occurred in September. The largest wildfire was 30 acres but had the potential to become much larger. Just as the fire was beginning to experience high spread rates, rain from a thunder cell dampened the fire enough to enable the crews to contain the fire.

No lightning-ignited fires occurred on the refuge during 1994. However, one management-caused wildfire did occur on the refuge in November when high winds (with peak gusts to 60 mph) caused smoldering peat in a fire break to ignite a 200-acre fire in the North Sump. Refuge staff had burned the fire break on the south end of Unit II-C in preparation for the prescribed fire in this unit six days before the wildfire occurred. Daily reconnaissance of the fire break for four days following the line work did not reveal the smoldering peat. The fire burned outside of the prescribed fire unit boundaries in decadent bulrush and in reality, significantly improved the habitat. During 1995, western wheatgrass (a native grass) recolonized the area and provided high quality pronghorn foraging habitat.

Refuge staff was assisted by a fire crew from the Elko District, Bureau of Land Management and two crews from the Nevada Division of Forestry out of Elko and Wells.

Refuge fire vehicles include a 1987 Chevrolet dual-wheel, 1 ton, 4X4 pick-up truck, which carries a 200-gallon slip-on pumper unit, and a 1991 Dodge, 1.5 ton, 4X4 truck, equipped with a 250 gallon tank, pump and fiberglass utility bed (similar to BLM light engines). The 1987 fire truck and pumper unit has not been reliable for the past two years and was taken out of service during most prescribed fires during 1994 because of equipment failure. A 1000-gallon polyethylene tank and pump was purchased in 1994 to provide water tender capabilities. The tank and pump are mounted on a metal frame which is fastened onto the bed of the refuge five-yard dump truck. These fire vehicles are invaluable to our prescribed fire program and critical for protection of refuge resources from wildfire and participation in interagency fire suppression activities. The refuge is the only federal land management agency that has fire vehicles and fire-trained personnel in Ruby Valley. Because the nearest federal or state wildfire suppression resources are 1.5 hours away, qualified refuge staff are dispatched by the Elko Interagency Dispatch Center (EIDC) to wildfires and other emergencies (through MOU's with other Federal and State agencies) in Ruby Valley and adjacent valleys.

In 1994, the refuge was offered and accepted an Associate Membership in the EIDC, which allows us to participate in fire-related business matters in this area without the obligation of financially supporting the EIDC operation. Wildlife Biologist Mackay participates in the EIDC Operations Group, which consists of Fire Management Officers from the Bureau of Land Management, the Humboldt National Forest, the Nevada Division of Forestry and the Bureau of Indian Affairs. The Group also functions as the MAC (Multi-Agency Command) group and is convened when local fire planning levels (similar to national fire preparedness levels) are three or greater.

In 1992, a Remote Automatic Weather Station (RAWS) was purchased from Forest Technology Systems and installed on the refuge. The RAWS is used primarily in the prescribed fire program, but is also useful during the wildfire season. Weather attributes measured by the RAWS include hourly wind speed and direction, maximum wind speed, maximum, minimum, and current temperature, relative humidity; precipitation and fuel stick temperature and moisture. A computer program is used to access the RAWS via the telephone and base radio, and generates a variety of fire parameters.

Firebreaks are maintained each year around refuge headquarters and the nearby Gallagher Fish Hatchery (NDOW facility) as a precautionary measure against wildfires. Local residents (i.e. Gallagher Fish Hatchery personnel) comprise the crew for the Ruby Valley #3 Volunteer Fire Department. A 750-gallon fire truck owned by Nevada Division of Forestry is stationed at the Gallagher Fish Hatchery and is often used as a water tender and a back-up engine when we conduct prescribed fires on the refuge.

10. Pest Control

Noxious weed infestations remain a moderate and persistent problem, primarily because of a lack of control efforts. Prior to 1991, hand control methods had generally prohibited infestations from increasing. Once confined to six to eight small areas, noxious weed infestations have expanded during the past four years on the levees surrounding the small marsh units, the spoil bank along the Collection Ditch and in some of the upland units.

Refuge Pesticide Use Proposals were approved for the use of Rodeo (Glyphosate) and Weedmaster (Banvil plus 2,4-D) to control white-top (hoary cress), Russian knapweed, Canada thistle, Scotch thistle and green rabbitbrush. Biological control insects for Canada thistle were released for the third time on the refuge during 1994. One hundred insects each of the seed head weevil (*Larinus planus*), the stem mining weevil (*Ceutorhynchus litura*) and the gall fly (*Urophora cardui*) were released in Unit I-A (seed head weevil only) and Unit I-B (all three insects). To date there has been no observations of insect over-winter survival since the program was initiated. Naturally occurring populations of rust disease and lace bugs were again observed on Canada thistle in 1994. Although not widespread on the refuge, these biocontrol agents are useful in our war on the weeds. Information was requested and received from the Agriculture Research Service (USDA) on propagation of the rust disease. Canada thistle has the potential to be eradicated in four to five years by using this biocontrol agent.

Approximately three miles (about seven acres) of the Collection Ditch were selectively sprayed with Rodeo in 1994. A total of 110 gallons of solution (1.5 percent) was applied with a hand sprayer. Canada thistle was mowed on approximately 3.5 miles of levee roads (edge of road only) in June. However, a second mowing treatment was needed to prevent flowering and seed development, but was not conducted.

11. Water Rights

The water rights adjudication process was initiated in 1990 when the appropriate documentation for Ruby Lake NWR was submitted to the State of Nevada Water Resources Engineer. In early 1992, the Office of the State Engineer was requested to determine if any valid water rights existed within the refuge boundary. The State Engineer found that the refuge has never held any state appropriated water rights. During 1993, the Nevada State legislature approved funds for water rights adjudication. This opened the door for the State Engineer to begin the adjudication process. Numerous water rights applications were prepared during 1994 by Paul Rauch, Regional Division of Engineering, and submitted to the Nevada State Engineer. To date, the State of Nevada has not taken any action on the applications.

G. WILDLIFE

1. Wildlife Diversity

Because of the rarity of wetlands in the Great Basin region, the refuge is a magnet for a wide diversity of wildlife species. Management of wetland and upland habitats is primarily directed towards providing high quality foraging and nesting areas for waterfowl and greater sandhill cranes. Many other wildlife species benefit from this effort including egrets, herons, shorebirds, raptors, other water-dependent bird species and songbirds, as well as many mammal species because of similar habitat preferences. There are 207 migratory and resident bird species that utilize the refuge. An additional 23 bird species are observed on the refuge infrequently. Mammals found on the refuge include many rodent species, mule deer, pronghorn, muskrats, rabbits and coyotes. The leopard frog occurs on the refuge; however, a complete species list of reptiles and amphibians occurring on the refuge has not been compiled.

2. Endangered and/or Threatened Species

Bald eagles are regularly observed on the refuge and throughout Ruby Valley during winter months. One bald eagle was often observed perched in a cottonwood tree located near Bressman Cabin. This tree remains a preferred traditional roost site. At least two different bald eagles were observed on the refuge during fall migration.

Following a peregrine falcon introduction program on the Refuge from 1984 to 1989, falcons were observed annually through 1990. No sightings of peregrine falcons have occurred since that time.

3. Waterfowl

The refuge is considered an important production area for waterfowl, but also attracts large numbers of migrating waterfowl from both the Pacific and Central flyways. The refuge is primarily important to nesting canvasbacks and redheads. There are 13 other species of waterfowl which nest in the marsh and meadows and 10 species which utilize the refuge during migration. The South Sump had the highest density of nesting canvasbacks in North America until their recent population decline.

Spring waterfowl populations peak generally in April as breeding birds arrive and as migrant birds move through the area. Fall migrating waterfowl generally begin arriving as early as mid-August and the population peaks generally during September-October. Most waterfowl move south once the marsh freezes. During fall, large concentrations of waterfowl utilize the large shallow open water areas in the South Sump. The shallow water provides high quality aquatic invertebrate foraging areas in addition to easy access to sago pondweed tubers and other submergent aquatic vegetation. During winter, the few remaining ducks, geese and swans are confined to open water on the Collection Ditch, spring ponds, and small shallow areas where flowing water inhibits ice formation.

In 1994, the estimated spring waterfowl population peaked in April at 7,207 birds, which was 0.4 percent lower than the estimated peak spring population in 1993. The fall population in 1994 peaked at 22,278 birds in September, 36 percent higher than in 1993. Total waterfowl

use-days in 1994 was nine percent above use-days in 1993, 11 percent above the 10-year mean, and 12 percent above objective (Table).

The estimated waterfowl breeding population in 1994 was two percent below that of 1993 and 15 percent below the 10-year mean (Table). Estimated waterfowl production in 1994 was three percent above estimated production in 1993 and 17 percent below the 10-year mean. Although estimated production in 1994 was the highest since 1990, production remains below objective. Reproductive effort (total production/ total # breeding pairs) in 1994 was 1.46, four percent above 1993 and less than one percent above the 10-year mean.

Table . Estimates of breeding populations, production, and use-days for waterfowl.					
Population	1991	1992	1993	1994	10-Year Mean
Trumpeter Swan					
Breeding Pairs	5	5	4	5	6
Production	3	1	5	9	6
Use-days	6594	6977	7288	9723	6231
Canada Goose					
Breeding Pairs	156	121	105	132	148
Production	204	180	110	190	266
Use-days	64581	73102	38593	89344	47786
Ducks					
Breeding Pairs	2414	2804	3219	3129	3707
Production	3850	4064	4546	4600	5528
Use-days	2545149	2045916	2468915	2639315	2370680
Total					
Breeding Pairs	2575	2930	3328	3266	3861
Production	4057	4245	4661	4799	5800
Use-days	2616324	2125995	2514796	2738382	2424697

a. Swans

Trumpeter swans were originally transplanted to the refuge from Red Rock Lakes NWR in southwestern Montana between 1947-58. A successful resident breeding population was established. During winter, migrant birds, presumably from the southeast Idaho area, western Wyoming or western Utah, use the refuge. Neck collared swans were not observed on the Refuge during 1994.

The resident trumpeter swan population is very small but appears to be stable. Despite the annual production of young, however, the population is not increasing because the young do

not remain here following their first winter. It is not known where the swans are relocating. Presumably, the young swans are migrating north with birds that winter on the refuge.

Five swan pairs initiated nesting; one pair each in marsh Units 10 and 14, and three pair in the South Sump. A pair in Unit 10 hatched two but only fledged one cygnet and three pairs in the South Sump fledged eight young. A pair in Unit 14 was unsuccessful. Swan production in 1994 was seven birds short of meeting the objective level.

Tundra swans are observed briefly on the refuge during the fall migration and winter. Their arrival is dictated by weather conditions in Alaska and Canada and the duration of their stay is usually less than two weeks. Only 12 tundra swans were observed during 1994, which is fewer than observed during 1993. In past years, as many as 300 birds have been observed.

Thirty-four swans were observed on the refuge in January and February. The swan population peaked at 49 birds in October and then declined to 43 birds in December. Swan use-days in 1994 were 33 percent above 1993 use-days and 56 percent above the 10-year mean (Table ?). Much of the increase in use-days is attributed to a larger swan population for a longer duration in winter.

b. Geese

The Canada goose is the only goose species utilizing the refuge year-long. Greater white-fronted geese and snow geese have been observed migrating through Ruby Valley. White-fronted geese have not been observed in the past four years. One snow goose spent February and part of the month of March on the refuge.

Canada geese using the refuge also use privately owned hay meadows adjacent to Franklin Lake. The goose population generally increases during winter, peaks prior to the nesting season and declines after the broods fledge, when many of the families leave the refuge in August. Although grazing is utilized to provide short grass foraging areas during the summer, the birds are apparently attracted to mowed hay meadows located on local ranches. Their departure may also be in response to high levels of predator pressure.

The peak goose population during 1994 was higher than the peak population 1993. The population peaked at 416 birds in February with a low of 43 birds in September. Goose use-days were 131 percent higher than 1993 and 87 percent higher than the 10-year mean (Table). However, use days in 1994 were 28 percent below the objective level. Goose production returned to near-past levels after a severe decline in 1993. Production in 1994 was 73 percent higher than in 1993 and 28 percent below the 10-year mean (Table). Goose production remained well below the objective level.

c. Ducks

The marsh and meadows on the refuge are managed to provide high quality nesting habitat for 13 duck species. However, the refuge primarily provides nesting habitat for canvasbacks and redheads in vast stands of bulrush located in the South Sump where the majority of diving duck nesting occurs.

Duck populations began increasing in early March with the arrival of early nesting species and early spring migrants. Spring population levels peaked in April as migrants moved through and as additional nesting ducks arrived. The estimated peak spring population in 1994 was three percent below 1993. The duck population then declined in mid-summer as non-breeders, males, and unsuccessful females moved to other locations to molt. The estimated fall duck population peaked in late September at 22,214 birds; 37 percent higher than 1993. During early November the majority of ducks departed the refuge because of record amounts of snow and record low temperatures which caused the marsh to freeze.

Table . Estimated breeding population and production for ducks on Ruby Lake NWR.							
Species	Prod. Obj.	1993 Pairs Young		1994 Pairs Young		10-Year Mean Pairs Young	
Mallard	--	232	132	258	348	279	455
Gadwall	--	598	982	434	694	734	1189
A. Wigeon	--	23	15	43	39	35	39
Grn-wgd Teal	--	133	89	45	41	32	34
Cin/Bl-wgd Teal	--	372	560	381	610	521	714
N. Shoveler	--	122	169	152	182	169	224
N. Pintail	--	179	120	181	217	99	144
Total Dabblers	5500 ^a	1659	2067	1494	2131	1869	2799
Redhead	2000	484	1060	469	694	589	776
Canvasback	3500	488	354	534	833	558	950
Lesser Scaup	--	283	658	288	507	256	272
Ring-neckd Duck	--	68	64	34	38	38	54
Ruddy Duck	--	237	343	310	397	397	540
Total Divers	8000 ^b	1560	2479	1635	2469	1838	2729
^a Production objectives not established for species within the dabbler group.							
^b An objective level of 2500 established for species other than redhead and canvasback.							

Duck use-days in 1994 were seven percent higher than use-days in 1993 and 11 percent above the 10-year mean (Table), and exceeded the objective level by 15 percent. Dabblers accounted for 1,586,792 use-days in 1993; ten percent higher than use-days in 1993. Divers accounted for 1,052,523 use-days in 1994; four percent higher than use-days in 1993. Higher use-days for ducks was due to above average populations in the fall.

The duck breeding population in 1994 was three percent lower than in 1993 and 16 percent below the 10 year mean (Table). In 1994, breeding dabbler species decreased slightly while

breeding diver species increased slightly as compared to 1993. Duck production in 1994 was one percent higher than in 1993 and 17 percent below the 10-year mean (Table) and well below the objective level (Table). With the exception of gadwall and green-winged teal, dabbling species production in 1994 was higher than in 1993. Canvasback and ruddy duck were the only diver duck species with increased production in 1994.

4. Marsh and Water Birds

The refuge provides wetland habitat for many other marsh dependent bird species. Greater sandhill cranes, which are part of the Lower Colorado River Valley population, use refuge, state, and private land in Ruby Valley for nesting and foraging. The cranes began arriving on the refuge in late February; earlier than normal because of mild spring weather.

Table . Estimated breeding population and production for greater sandhill cranes on Ruby Lake NWR.				
Year	Pairs	Colts		Production Objective
		Hatched	Fledged	
1983	24	15	15	48
1984	29	5	2	48
1985	34	3	3	48
1986	25	3	0	48
1987	15	2	0	48
1988	15	0	0	48
1989	12	5	0	48
1990	10	0	0	48
1991	15	2	0	48
1992	13	17	0	48
1993	15	5	0	48
1994	15	16	2	48
Mean	19	6	2	48

At the end of March, 21 pair were counted on the refuge. Fifteen pairs were observed on nesting territories in early May (Table). The number of colts observed on the refuge increased significantly this year; however, only two of the sixteen colts survived to fledge. The surviving colts were reared in a small winter wheat plot, within 300 yards of the refuge headquarters. This is the first successful production of colts in the past nine years. Extremely high predator pressure resulted in zero crane production the previous eight years. The survival of the two colts may be in part due to the reluctance of coyotes to forage in the

vicinity of the refuge headquarters, as well the coyote population in south Ruby Valley appears to have decreased following the crash of the local rabbit population.

Three grebe species, Western, eared and pied-billed, continue to nest on the refuge, although at low levels. The Clark's grebe has been observed, but it is not known if this species nests on the refuge. Double-crested cormorants and great egrets began nesting on the refuge in 1989 and continued to use the refuge during 1994. Both species, in addition to snowy egrets and white-faced ibis (a C2 species), nested in one colony located in marsh Unit 14. A second smaller ibis colony located in the South Sump was also utilized. Irrigated meadows which are managed to provide foraging habitat for sandhill cranes and Canada geese also provided high quality foraging areas for these wading species.

Great-blue herons, American bitterns and black-crowned night herons also nest on the refuge. These species nested in the colony located in marsh Unit 14. Cattle egrets continue to utilize the refuge during summer where they are observed foraging in the meadows.

White pelicans are infrequently observed on the refuge. In early April, eight birds were observed.

During 1994, coot use-days were nine percent above use-days in 1993 and 57 percent below the 10-year mean (Table). Despite the increase in use-days from 1993, the 1994 estimated breeding population and production was lower than in 1993. Coot production in 1994 was 17 percent lower than in 1993 and 58 percent below the 10-year mean (Table).

Table . Estimated coot breeding population, production and use days.					
	1991	1992	1993	1994	10-Yr Mean
Breeding Pair	1925	1011	1135	858	3192
Production	2888	1929	1978	1647	3970
Use Days	1976200	830020	662323	723400	1674570

5. Shorebirds, Gulls, Terns and Allied Species

The majority of shorebird species using the refuge are migrants. When alkali playas are seasonally flooded, large numbers of shorebirds forage in these high quality areas and some species nest in the adjacent uplands. Winter water was routed to the North Sump which provided the only high quality shorebird habitat in northeast Nevada in 1994 because other alkali playas in the region were not flooded. The North Sump received use by large numbers of shorebirds, especially American avocets, during spring and summer. Of the eight shorebird species which nest here (see wildlife checklist), long-billed curlew (a C3A species), killdeer and common snipe are the most numerous since they are less dependent on shallow wetlands.

Three gull species use the refuge but only California gulls nest here. During 1994, 28 pairs nested in Unit 21. These birds hatched young but none survived to fledge. The number of breeding California gulls has remained nearly constant since they began nesting here in 1990.

Both Forester's and black terns nest on the refuge. A few Caspian terns are observed during the summer, but this species does not nest on the refuge. Black terns are more numerous than Forester's terns, and both species nest in the diked marsh units or occasionally in the South Sump. Following a winter-like storm with high winds in June, all terns abandoned their nests. Few terns were observed on the refuge during the remainder of the summer.

6. Raptors

A variety of raptor species are present in the area during all months of the year. The layout of the marsh and uplands on the refuge with a seasonally abundant prey supply located near a source of nesting habitat creates an ideal environment for raptors. The more common nesting species include turkey vulture, red-tailed hawk, northern harrier and American kestrel. Golden eagles, prairie falcons, great-horned owls and short eared owls also nest in the area and utilize the refuge throughout the year. Rough-legged hawks are common winter residents on the refuge. Ferruginous and Swainson's hawk, Candidate 2 species under the Endangered Species Act, are occasionally observed on the refuge and in Ruby Valley during the nesting season but are not known to nest on the refuge.

7. Other Migratory Birds

Because of the harsh winter climate in Ruby Valley and northeast Nevada, most bird species use the refuge during migration, and nesting species are only present during spring, summer and fall. A total of 78 non-waterfowl or non-marsh bird species nest on the refuge in the wet meadows, grasslands, sagebrush steppes and riparian areas.

In cooperation with the Migratory Bird and Habitat Research Laboratory, the annual breeding bird survey was conducted along a route established on the southwest side of the Ruby Mountains. The survey provides important information on annual occurrence of nesting species and breeding bird population trends in the Great Basin. A total of 35 species were observed during 1994. The Brewer's sparrow was again the most abundant species followed by sage thrasher, pinion jay, mountain bluebird and morning dove. This route has been surveyed by various refuge staff since 1965.

To gather information on bird species wintering in the area, the refuge has hosted the Audubon Christmas Bird Count since 1978. On 28 December, nine participants conducted the count on a cold and snowy day. A total of 45 species were observed by the participants and 1146 individual birds were counted. Both number of species and total birds counted was lower than average because of harsh winter conditions during November and part of December which encouraged many birds to migrate south.

8. Game Mammals

Mule deer are the most abundant big game mammal species on the refuge and are frequently observed throughout the year. The refuge meadows, grasslands and sagebrush steppe provide a small amount of winter range habitat for mule deer migrating south along the eastern flank of the Ruby Mountains.

Pronghorn antelope were released near the southeast side of the refuge (off-refuge) in 1988 by the Nevada Dept. of Wildlife in an effort to increase the size of the local herd. Since the release pronghorn have been frequently observed during aerial waterfowl surveys and occasionally observed during ground excursions on the refuge. The pronghorn are attracted to the refuge because of the availability of forage and water, especially during the past drought years. Some of the boundary fences have been modified to facilitate access to the refuge by the pronghorn. During 1994, at least four different herds of pronghorn were observed in the North Sump and adjacent meadows, and in meadows adjacent to the South Sump. At least seven young were observed on the refuge in 1994.

10. Other Resident Wildlife

Very few bird species remain here throughout the entire year. The more common resident species include northern flicker, horned lark, pinyon jay, black-billed magpie, common raven, plain titmouse, bushtit and dark-eyed junco. Although not common, sage grouse are found on the refuge through the year. In cooperation with the Nevada Dept. of Wildlife, Wildlife Biologist Mackay conducts annual lek ground surveys during the spring. At least one viable lek site is located on the west side of the refuge on Forest Service administered land. There is the potential that another lek is located at the south west end of the refuge but this site has not been confirmed. During 1994, 19 separate observations were made of sage grouse on the refuge or at the lek site with the number of birds observed ranging from 1 to 14. The sagebrush steppe area near the Indian Creek gravel pit is the core use area of the sage grouse.

Other resident wildlife includes a large variety of small mammals. Coyotes are abundant in south Ruby Valley and several dens are located on the refuge. Because of the abundance of prey on the refuge, it is likely that the density of coyotes on the refuge is higher than the surrounding area. Consequently, because of the high coyote population level and the increased demand for food by their offspring, wildlife dependent on habitats managed by the refuge are being negatively impacted by these predators. Striped skunks were first documented in south Ruby Valley during 1992. They seem to prefer Cave Creek near the refuge headquarters and the Gallagher Fish Hatchery and have been removed to prevent problems. During 1994, four skunks were removed from the hatchery, four from Cave Creek, and two from the dump located just north of the refuge headquarters.

Blacktail jackrabbits are the most abundant rabbit species and provide an important food resource for many birds of prey and coyotes. During 1994, blacktail jackrabbits were again scarce because of a major winter-kill caused by the deep, winter-long snowpack on the basin floor during 1993.

11. Fisheries Resources

Historically, the small relict dace (*Relictus solitarius*), endemic to northeast Nevada, was abundant in the marsh but drastically declined following the introduction of largemouth bass in 1932-33. The relict dace now occurs only in a few isolated spring ponds and spring channels. Surveys conducted during 1994 by the Nevada Division of Wildlife (NDOW) found that the relict dace population on the refuge has further declined since the last survey conducted in 1982. Some of the springs where the relict dace was previously observed are dry due to the drought or are overgrown. Additionally, there appears to have been much hybridization with speckled dace. The speckled dace were introduced as a forage fish for bass. Although the relict dace has not been extirpated from the refuge, the population is in need of immediate enhancement action to assure their long-term viability. Only two other valleys in this region contain populations of relict dace but they are vulnerable to loss because the land is not protected. The decline of the bass population in the South Sump has reduced some of the vulnerability to loss of the relict dace on the refuge.

The South Sump is the primary management area for bass. At one time the refuge was listed in a popular sporting magazine as one of the top ten bass fishing locations in the United States. Following several years of high fishing pressure (Section H.1) the bass population began showing signs of over-harvest. Regulations were implemented by NDOW to facilitate growth of bass to spawning size before they were harvested, but were executed after the population was significantly reduced. Poor habitat conditions prevailed during 1992 and 1993 as the South Sump was mostly dry, however, and few, if any, bass survived the harsh winter. Because the widespread drought has caused a significant draw-down of most reservoirs and a reduction in their associated fisheries, NDOW only obtained a few breeding-age bass for restocking in the South Sump (Section 12).

NDOW frequently plants trout on the refuge, primarily in the Collection Ditch, South Sump and large spring ponds along the west side of the refuge (Section 12). Trout found on the refuge include eastern brook, cutthroat, rainbow and brown trout. A hybrid of brown and brook trout, called the tiger trout, was developed by personnel at the Gallagher Fish Hatchery. Until 1991, the tiger trout was planted exclusively on the refuge and to date the record of the largest fish taken is from the refuge.

12. Wildlife Propagation and Stocking

The existence of the trout fishery at the refuge is dependent on annual stocking. All trout stocked on the refuge are reared at the state-operated Gallagher Fish Hatchery. The total number of fish stocked on the refuge in 1994 was 55 percent less than stocked in 1993 (Table). However, much of the difference in the stocking levels between the two years is because no fry were stocked on the refuge during 1994. NDOW planted two percent less catchable-size trout on the refuge in 1994 than in 1993. A total of 2,001 breeding age bass were planted in the South Sump in an effort to rebuild their population rapidly. Bass are not normally planted on the refuge because they reproduce successfully in the marsh.



Table . Trout and bass stocked by Nevada Division of Wildlife on Ruby Lake NWR.					
Species	1990	1991	1992	1993	1994
Rainbow	24,505	106,197	263,322	71,362	38,128
Brown	4,613	4,664	1,875	1,439	1,639
Tiger	6,016	8,900	9,896	14,545	0
Brook	6,000	5,854	6,500	0	11,169
Cutthroat	0	0	5,027	0	0
Bass	0	0	0	30,839	2,001
Total	41,134	125,615	286,620	118,185	52,937

15. Animal Control

The muskrat population during 1994 was at a low enough level that trapping was not warranted or conducted.

17. Disease Control and Prevention

Disease outbreaks are not a regular occurrence on the refuge. Most of the annual mortality is attributed to natural causes among ducklings and goslings. Past diagnostic work has shown that a nematode (*Streptocara* sp.) which causes ulcerative proventriculitis is responsible for a portion of the young waterfowl mortality on the refuge. There is no historical evidence that indicates disease outbreaks caused by avian botulism or cholera have occurred on the refuge.

H. PUBLIC USE

1. General

Public use for 1994 was estimated at 13,412, a 27 percent increase over 1993 (Table). The number of visitors fishing on the refuge (for trout) increased during 1994. The increase is likely a result of mild weather during late winter/early spring which made conditions more enjoyable for outside recreation. The number of visitors utilizing the refuge for wildlife observation and other non-fishing related activities continues to increase steadily. The number of waterfowl hunters using the refuge in 1994 was slightly higher than in 1993.

Table . Estimates of visitors by activity category on Ruby Lake NWR.					
Year	Fishing	Wildlife Observation	Migratory Bird	Other ^b	Total

			Hunting ^a		
1994	9365	3273	264	300	13202
1993	7196	2871	239	121	10427
1992	7242	2725	52	163	10182
1991	9084	720	324	846 ^c	10974
1990	20505	1699	307	1336	23847
1989	51366	2850	402	1396	56014
Average ^d	19079	2173	265	772	22289
^a Estimates for migratory bird hunting are on a calendar year basis; therefore, portions of two seasons are reported. ^b Other includes trapping, interpretation, x-country skiing, ice skating and bicycling. ^c Includes gravel hauling for county road project 07/91 to 08/91. ^d Five year average calculated for 1989-1993.					

2. Outdoor Classrooms - Students

Refuge staff conducted two outdoor environmental education presentations during 1994. In May, Wildlife Biologist Mackay presented a program titled "Waterfowl Identification Made Easy" to eight 6th grade classes in Lamiolle Canyon, Humboldt National Forest. Students are each given a poster board containing a picture of a waterfowl species which has been colored to highlight cues to use in identifying the species, and a written description of the species. The students read the description of the species while showing the picture to the class. This type of presentation encourages learning since the students are participating. Also in May, Mackay presented a program titled "Wetlands and Wildlife" on the Refuge. Using a wetlands demonstration board, the students learn the function and value of wetlands. The students are exposed to wildlife found on wetlands through a guided tour of the refuge.

7. Other Interpretive Programs

In March, Mackay presented the "Wetlands and Wildlife" program to six, fifth grade classes at Spring Creek Elementary School. Slides of marsh habitat and wildlife were substituted for the tour. This program was conducted during the school's Environmental week which is designed to increase awareness of the environment.

8. Hunting

Only migratory bird hunting is permitted on the refuge, with open seasons for ducks, geese, coots, moorhens and snipe. Only dark geese may be hunted to prevent shooting of trumpeter swans. The hunt area is approximately 8,600 acres, including permanent marsh, flooded alkali playas and springheads.

The 1994-95 migratory game bird season was a split season for ducks, mergansers, coots, moorhens and snipe. The first part was open 1-16 October, and the second part was open 29 October - 20 December. The goose season opened 15 October and closed 22 January.

The combined daily limit on ducks was four, including no more than three mallards, only one female; no more than two redheads or canvasbacks, or one of each; no more than one pintail of either sex. The possession limit for ducks was twice the daily bag limit. The daily and possession limit for coots and common moorhens was 25. The daily limit for snipe was eight and possession limit was 16. Daily limit for geese was three and possession limit was six.

Waterfowl numbers peaked in October. Hunting conditions were affected by the freezing of the marsh (earlier than in 1993), and marginal water levels for boating prior to freeze-up.

Table . Waterfowl hunting data for 1994-95 waterfowl season on Ruby Lake NWR.			
Species	# Birds Checked in Bag	Percent of Total	Estimated # of Birds Killed
Green-winged teal	29	21.3	135
Gadwall	20	14.7	93
Mallard	20	14.7	93
Coot	19	14.0	89
American wigeon	13	9.6	61
Northern pintail	8	5.9	38
Lesser scaup	7	5.1	33
Northern shoveler	6	4.4	28
Canvasback	4	2.9	18
Common goldeneye	4	2.9	18
Redhead	2	1.5	10
Ring-necked duck	2	1.5	10
Cinnamon teal	1	0.7	4
Canada goose	1	0.7	4
Total	136		634

Waterfowl hunting information was gathered from 31 hunters through surveys conducted by refuge personnel and information requested from local resident hunters (refuge and fish hatchery personnel). These hunters accounted for 57 hunter visits (21.6 percent of the estimated total number of hunter visits), killed 136 birds, and reported 19 crippled birds (birds shot but not retrieved). Dogs were used to retrieve waterfowl by 37 percent of those

hunters surveyed. Surveyed hunters conducted hunting by walking and jump-shooting waterfowl (27.2 percent), from a boat (8.1 percent), and from a ground blind (8.1 percent).

The number of waterfowlers hunting on the refuge and the amount of time spent hunting during the 1994-95 season was nearly the same as during the 1993-94 season (Table). An estimated 634 birds were killed at 2.4 birds killed per hunter visit. Fourteen waterfowl species were known to be killed with the green-winged teal as the most numerous species bagged. Gadwall and mallard were equally represented in the bag, closely followed by coot, though this number is likely overestimated because one individual surveyed had shot a large number of coots. Most refuge hunters do not shoot coots. All other species killed each represented less than ten percent of the bag. The crippling rate was 12 percent.

One state-licensed guide receives a Special Use Permit annually to guide waterfowl hunters on the refuge. This guide led five hunters on two different days, who killed a total of 40 waterfowl.

Table . Estimated statistics for waterfowl hunting on Ruby Lake NWR.				
Hunting Season	Hunter Visits	Hours Hunted	Birds Retrieved ^a	Average Birds Per Hunter
1994-95	264	475	634	2.4
1993-94	269	488	515	1.9
1992-93	52	182	57	1.1
1991-92	324	907	680	2.1
1990-91	307	890	583	1.9
1989-90	470	1175	550	1.2
Average	284	728	477	1.6
^a Includes ducks, geese and coots.				

9. Fishing

Anglers visit the refuge in pursuit of largemouth bass and rainbow, brook, cutthroat, brown, and tiger (brown x brook) trout. All trout are reared and stocked by the Gallagher Fish Hatchery which is located on the refuge and operated by the Nevada Division of Wildlife (Section G.12). Fishing for trout on the refuge is best in spring and fall when water temperatures are cooler and trout are more active. Bass fishing is best during the breeding season when adults are guarding fry and during summer months when the water is warmer.

Anglers accounted for an estimated 71 percent of the total refuge visits in 1994. While the number of anglers fishing on the refuge in 1994 increased over 1993, the percentage of this type of use relative to other uses of the refuge in 1994 was nearly the same as in 1993. The

bass fishery is recovering slowly from drought impacts but remains poor. Until the bass fishery is re-established, angler use on the refuge is expected to remain low.

A new state record for the tiger trout was established in 1994. The dragline contractor working on the Collection Ditch caught the fish which measured 25.5 inches and weighed 8 pounds, 8 ounces (Figure). This fish edged out the old record by less than 0.5 inch but the weight was identical.

11. Wildlife Observation

Wildlife observation has accounted for a greater percentage of refuge visitors. Wildlife observers, including photographers, accounted for an estimated 25 percent of the visitors to the refuge in 1994. This is a two percent decrease from 1993.

Recent publication of visitor guides on Nevada, which include the refuge, are increasing awareness of the refuge and are likely contributing to an overall increase in non-consumptive visitors.

16. Other non-Wildlife Oriented Recreation

It is difficult to single out non-wildlife oriented recreation on the refuge. The refuge is used by bicyclists, picnickers, ice skaters, x-country skiers, etc. These recreationalists likely pursue these activities on the refuge because of the wildlife and wildland scenes.

17. Law Enforcement

Two refuge employees are qualified law enforcement officers; Refuge Manager Pennington and Maintenance Worker Johnson. The peak public use period is from spring through fall; due to low public use, however, there are fewer enforcement type problems and therefore, fewer patrols. One Nevada Division of Wildlife officer periodically patrols the refuge when he is in this part of his district.

citations?

I. EQUIPMENT AND FACILITIES

1. New Construction

A fire escape was constructed by Maintenance Worker Johnson and temporary Maintenance Worker Pavey in the basement of Quarters #46. Three bedrooms were built in the basement in FY-93 to accommodate the large family now occupying the quarters. Only one exit from the basement to the main level of the house existed and the new escape exit now provides egress to the outside of the house.

2. Rehabilitation

Approximately 5.2 miles of the Collection Ditch was cleaned under an equipment requirements contract. The contractor, Art Lacey Construction of Cambridge, Idaho, cleaned 2-3 feet of silt and mud from the ditch. The work began at the cement water control structure behind Gallagher Fish Hatchery and ended at the north end of the ditch.

It was determined that the water control structure behind the hatchery and two culverts in the ditch were originally installed approximately two feet higher than the bottom of the ditch. These structures were interfering with the flow of the water and complicated water management on the refuge. The water control structure was modified and the two culverts were removed and reinstalled, all two feet lower in elevation. The alterations to the water control structure and culverts were not anticipated and subsequently increased the cost of the ditch cleaning project.

3. Major Maintenance

A rebuilt engine was installed into the newly acquired Galion grader picked up from excess property in FY-93. Total cost was \$15.0K and was funded as an MMS Priority project. This grader is a welcome addition to the equipment inventory. It has an enclosed cab and makes snow plowing at -30° F much more tolerable than the open cab Huber grader it replaced.

Three sandblasted, redwood entrance signs were received in late 1993 and will be used to replace the old deteriorated signs. The sign at the north end of the refuge was installed during 1994 (Figure). The sign at the office will be installed in 1995, and the south sign will be installed after the acquisition of Fort Ruby Ranch is accomplished; the new south boundary will be approximately 1.5 miles south of its present location.

Figure . New north entrance sign featuring a male canvasback. The base was constructed and the sign installed by Maintenance Worker Dan Johnson.
(DLP 1/95)

Work continued on upgrading the irrigation systems in the meadows on the refuge. Ditches were cleaned and/or recontoured, irrigation turnouts were installed to reduce irrigation

efforts, and work began on replacing the washed out North Narciss pond levee. Plans are to finish the levee in 1995.

4. Equipment Utilization and Replacement

A military surplus front-end loader was received from Tooele Army Depot in Utah. Maintenance Worker Johnson replaced the dash panel and three tires to make the unit operational, at a cost of under \$3,000. The loader is in excellent condition.

5. Communication Systems

mobile radios purchased? installed?

6. Computer Systems

A new 486 computer was purchased and two outdated 286 computers were replaced with 486 computers. A 386 brings the refuge computer total to four. These machines have significantly aided in the preparation of all types of documents, from letters to reports and plans. It is important that most staff have a computer in their office because each employee is responsible for word processing their own documents.

8. Other

The excess Huber grader was transferred to Red Rock Lakes NWR in southwestern Montana. Maintenance mechanic, Del Lee, from Stillwater NWR, transported the grader to the refuge using Stillwater NWR's tractor and lowboy.

J. OTHER ITEMS

1. Cooperative Programs

Wildlife Biologist Mackay conducted spring and fall shorebird surveys in northeast Nevada. This is a cooperative effort with the Nevada Division of Wildlife (NDOW) and the Point Reyes Bird Observatory.

Interagency visitor center (Section E.8). ?

Six refuge employees (one permanent and five YCC) backpacked into the Goshute Mountains in late July. The purpose of the trip was to assist with setting up the main camp at the Goshute Mountain Raptor Project in northeastern Nevada. The Project is staffed by volunteers who gather data on raptor migration by observation and trapping. The work is organized by HawkWatch International in Salt Lake City, Utah, a non-profit organization which receives funds from the USFWS and the Bureau of Land Management.

Refuge staff participated in a fishing derby at Angel Lake in cooperation with the U.S. Forest Service, Nevada Division of Wildlife, and Nevada Highway Patrol on 11 June. The derby, which was in celebration of National Fishing Week, drew 110 participants; 80 children and 30 adults.

Refuge staff operate a weather station in cooperation with the National Weather Service. Weather information has been routinely collected since 1940.

4. Credits

Daniel Pennington:

Jeff Mackay:

Niki McQueary: Assemble

Kevin DesRoberts: Edit